

Claims

1. A method for reducing call setup delay comprising:
 - 5 determining, by a base station (BS) prior to a channel assignment, whether upon channel assignment a mobile station (MS) may require a higher data rate than that which a primary channel can provide;
 - 10 when the MS is in a non-traffic state and when the BS determines that the MS may require the higher data rate upon channel assignment, sending, by the BS, channel assignment messaging to the MS to transition the MS to a traffic state, wherein the channel assignment messaging comprises primary channel assignment information and IS-2000 Supplemental Channel assignment information.
- 15 2. The method of claim 1, wherein the primary channel comprises a channel from the group consisting of a fundamental channel, a dedicated control channel, and a channel that is at least partially control-bearing, and wherein primary channel assignment information comprises channel assignment information from the group consisting of fundamental channel assignment information, dedicated control channel assignment information, 20 and assignment information for a channel that is at least partially control-bearing.
- 25 3. The method of claim 1, wherein the non-traffic state comprises a state from the group consisting of an access state and an idle state.
4. The method of claim 1, further comprising
 - 30 sending, by the BS to the MS, data via a Forward Supplemental Channel (FSCH) corresponding to the IS-2000 Supplemental Channel assignment information.
 5. The method of claim 4, wherein the data is sent without the BS sending to the MS a Service Connect Message (SCM) between sending the channel assignment messaging and sending the data.

6. The method of claim 4, further comprising
assigning, by the BS to the MS, a Reverse Supplemental Channel
(RSCH) in anticipation of signaling by the MS in response to the data sent.

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7. The method of claim 1, wherein determining whether the MS may
require the higher data rate comprises detecting whether at least one
indicator is present from the group consisting of
an amount of data waiting to be sent to the MS is greater than a
10 threshold,

email is waiting to be sent to the MS, and
voice mail is waiting to be sent to the MS.

8. The method of claim 1, further comprising

15 receiving, by the BS from the MS, data via a Reverse Supplemental
Channel (RSCH) corresponding to the IS-2000 Supplemental Channel
assignment information.

9. The method of claim 8, wherein the data is received without the BS

20 sending to the MS a Service Connect Message (SCM) between sending the
channel assignment messaging and receiving the data.

10. The method of claim 1, wherein the channel assignment messaging
comprises an IS-2000 Extended Channel Assignment Message (ECAM).

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11. The method of claim 1, wherein the channel assignment messaging comprises at least some information from the group consisting of

5 a supplemental channel identifier,

an indication of forward / reverse assignment type,

an indication of the number of supplemental channels assigned,

an indication of a duration for the supplemental channel assignment,

an indication of a start time for the supplemental channel assignment,

an indication of start time units used to indicate the start time,

an indication of a maximum allowed duration for discontinuous

10 transmission,

an indication of whether to use the T_ADD Reverse Supplemental Channel abort feature,

an indication of a Walsh cover identifier for the supplemental channel assignment, and

15 an indication of the number of bits per frame index.

12. The method of claim 11, wherein the start time indicated for the supplemental channel assignment is determined based on an expected traffic channel tuning completion time and on a relative quantity of available wireless resources,

20 wherein the start time determined is earlier when the relative quantity of available wireless resources is greater, and

wherein the start time determined is later when the relative quantity of available wireless resources is less.

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13. The method of claim 1, wherein determining whether the MS may require the higher data rate comprises receiving a request from the MS for a supplemental channel.

30 14. The method of claim 13, wherein the request from the MS for a supplemental channel is received via messaging of a messaging type from the group consisting of origination messaging, page response messaging, and reconnect messaging.

15. The method of claim 1, wherein determining whether the MS may require the higher data rate comprises anticipating that the MS may require the higher data rate without an explicit indication that the MS will require the higher data rate.

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16. The method of claim 15, wherein anticipating that the MS may require the higher data rate involves detecting whether at least one indicator is present from the group consisting of

10 the MS is capable of supplemental channel operation,
a quantity of available wireless resources is greater than a threshold,
a priority service level is associated with the MS,
recent supplemental channel usage by the MS,
a recent use by the MS of a service that uses a supplemental channel,
15 data burst messaging is received from the MS,
the MS is requesting a data service,
the MS is requesting a dispatch service,
the MS is indicating that the MS has data ready to send,
the MS is indicating an amount of data waiting to be sent greater than
20 a threshold, and
a battery of the MS is low.

17. The method of claim 16, wherein the BS receives request messaging from the MS that indicates a requested service using a Service Option (SO) field and that indicates data ready to send using a Data Ready to Send (DRS) field.

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18. A method for reducing call setup delay comprising:

5 sending, by a base station (BS) to a mobile station (MS), a channel assignment to transition the MS to a traffic state, wherein the channel assignment provides primary channel assignment information;

10 determining, by the BS, prior to service connection, whether upon service connection the MS may require a higher data rate than that which a primary channel can provide;

15 when the BS determines that the MS may require the higher data rate upon service connection,

20 sending, by the BS to the MS in the traffic state, service connection messaging that comprises IS-2000 Supplemental Channel assignment information.

19. The method of claim 18, wherein the primary channel comprises a

15 channel from the group consisting of a fundamental channel, a dedicated control channel, and a channel that is at least partially control-bearing, and

20 wherein primary channel assignment information comprises channel assignment information from the group consisting of fundamental channel assignment information, dedicated control channel assignment information,

25 and assignment information for a channel that is at least partially control-bearing.

20. The method of claim 18, further comprising

25 sending, by the BS to the MS, data via a Forward Supplemental Channel (FSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

21. The method of claim 20, further comprising

30 assigning, by the BS to the MS, a Reverse Supplemental Channel (RSCH) in anticipation of signaling by the MS in response to the data sent .

22. The method of claim 18, wherein determining whether the MS may require the higher data rate comprises detecting whether at least one indicator is present from the group consisting of

5 an amount of data waiting to be sent to the MS is greater than a threshold,

email is waiting to be sent to the MS, and

voice mail is waiting to be sent to the MS.

23. The method of claim 18, further comprising

10 receiving, by the BS from the MS, data via a Reverse Supplemental Channel (RSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

24. The method of claim 18, wherein the service connection message

15 comprises an IS-2000 Service Connect Message (SCM).

25. The method of claim 18, wherein the service connection message comprises at least some information from the group consisting of

a supplemental channel identifier,

20 an indication of forward / reverse assignment type,

an indication of the number of supplemental channels assigned,

an indication of a duration for the supplemental channel assignment,

an indication of a start time for the supplemental channel assignment,

an indication of start time units used to indicate the start time,

25 an indication of a maximum allowed duration for discontinuous transmission,

an indication of whether to use the T_ADD Reverse Supplemental Channel abort feature,

30 an indication of a Walsh cover identifier for the supplemental channel assignment, and

an indication of the number of bits per frame index.

26. The method of claim 18, wherein determining whether the MS may require the higher data rate comprises receiving a request from the MS for a supplemental channel.

5 27. The method of claim 26, wherein the request from the MS for a supplemental channel is received via messaging of a messaging type from the group consisting of origination messaging, page response messaging, and reconnect messaging.

10 28. The method of claim 18, wherein determining whether the MS may require the higher data rate comprises anticipating that the MS may require the higher data rate without an explicit indication that the MS will require the higher data rate.

15 29. The method of claim 28, wherein anticipating that the MS may require the higher data rate involves detecting whether at least one indicator is present from the group consisting of

- the MS is capable of supplemental channel operation,
- a quantity of available wireless resources is greater than a threshold,
- 20 a priority service level is associated with the MS,
- recent supplemental channel usage by the MS,
- a recent use by the MS of a service that uses a supplemental channel,
- data burst messaging is received from the MS,
- the MS is requesting a data service,
- 25 the MS is requesting a dispatch service,
- the MS is indicating that the MS has data ready to send,
- the MS is indicating an amount of data waiting to be sent greater than a threshold, and
- a battery of the MS is low.

30. The method of claim 29, wherein the BS receives request messaging from the MS that indicates a requested service using a Service Option (SO) field and that indicates data ready to send using a Data Ready to Send (DRS) field.

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31. A method for reducing call setup delay comprising:

receiving, from a base station (BS) by a mobile station (MS) in a non-traffic state, channel assignment messaging to transition the MS to a traffic state, wherein the channel assignment messaging comprises primary channel assignment information and IS-2000 Supplemental Channel assignment information;

5 acquiring a primary channel using the primary channel assignment information; and

10 after acquiring the primary channel, using a supplemental channel corresponding to the IS-2000 Supplemental Channel assignment information.

32. The method of claim 31, wherein the primary channel comprises a channel from the group consisting of a fundamental channel, a dedicated control channel, and a channel that is at least partially control-bearing, and

15 wherein primary channel assignment information comprises channel assignment information from the group consisting of fundamental channel assignment information, dedicated control channel assignment information, and assignment information for a channel that is at least partially control-bearing.

20 33. The method of claim 31, wherein the non-traffic state comprises a state from the group consisting of an access state and an idle state.

25 34. The method of claim 31, wherein using the supplemental channel comprises receiving, by the MS from the BS, data via a Forward Supplemental Channel (FSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

30 35. The method of claim 34, wherein the data is received without the MS receiving from the BS a Service Connect Message (SCM) between receiving the channel assignment messaging and receiving the data.

36. The method of claim 31, wherein using the supplemental channel comprises sending, by the MS to the BS, data via a Reverse Supplemental Channel (RSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

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37. The method of claim 36, wherein the data is sent without the MS receiving from the BS a Service Connect Message (SCM) between receiving the channel assignment messaging and sending the data.

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38. The method of claim 31, wherein the channel assignment messaging comprises an IS-2000 Extended Channel Assignment Message (ECAM).

39. The method of claim 31, wherein the channel assignment messaging comprises at least some information from the group consisting of

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a supplemental channel identifier,
an indication of forward / reverse assignment type,
an indication of the number of supplemental channels assigned,
an indication of a duration for the supplemental channel assignment,
an indication of a start time for the supplemental channel assignment,

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an indication of start time units used to indicate the start time,
an indication of a maximum allowed duration for discontinuous transmission,

an indication of whether to use the T_ADD Reverse Supplemental Channel abort feature,

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an indication of a Walsh cover identifier for the supplemental channel assignment, and
an indication of the number of bits per frame index.

40. The method of claim 31, further comprising sending, by the MS to the BS, a request for a supplemental channel via messaging of a messaging type from the group consisting of origination messaging, page response messaging, and reconnect messaging.

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41. A method for reducing call setup delay comprising:

receiving, from a base station (BS) by a mobile station (MS), a channel assignment to transition the MS to a traffic state, wherein the channel assignment provides primary channel assignment information;

5 acquiring a primary channel using the primary channel assignment information;

receiving, by the MS in the traffic state, service connection messaging that comprises IS-2000 Supplemental Channel assignment information; and

10 after service connection, using a supplemental channel corresponding to the IS-2000 Supplemental Channel assignment information.

42. The method of claim 41, wherein the primary channel comprises a channel from the group consisting of a fundamental channel, a dedicated control channel, and a channel that is at least partially control-bearing, and

15 wherein primary channel assignment information comprises channel assignment information from the group consisting of fundamental channel assignment information, dedicated control channel assignment information, and assignment information for a channel that is at least partially control-bearing.

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43. The method of claim 41, wherein using the supplemental channel comprises receiving, by the MS from the BS, data via a Forward Supplemental Channel (FSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

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44. The method of claim 41, wherein using the supplemental channel comprises sending, by the MS to the BS, data via a Reverse Supplemental Channel (RSCH) corresponding to the IS-2000 Supplemental Channel assignment information.

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45. The method of claim 41, wherein the service connection message comprises an IS-2000 Service Connect Message (SCM).

46. The method of claim 41, wherein the service connection message comprises at least some information from the group consisting of

- 5 a supplemental channel identifier,
- an indication of forward / reverse assignment type,
- an indication of the number of supplemental channels assigned,
- an indication of a duration for the supplemental channel assignment,
- an indication of a start time for the supplemental channel assignment,
- an indication of start time units used to indicate the start time,
- an indication of a maximum allowed duration for discontinuous
- 10 transmission,
- an indication of whether to use the T_ADD Reverse Supplemental Channel abort feature,
- an indication of a Walsh cover identifier for the supplemental channel assignment, and
- 15 an indication of the number of bits per frame index.

47. The method of claim 41, further comprising sending, by the MS to the BS, a request for a supplemental channel via messaging of a messaging type from the group consisting of origination messaging, page response messaging, and reconnect messaging.

48. A base station (BS) comprising:

5 a transceiver;

 a controller, communicatively coupled to the transceiver,

 adapted to determine, prior to a channel assignment, whether

10 upon channel assignment a mobile station (MS) may require a higher data rate than that which a primary channel can provide, and

 adapted to send, via the transceiver when the MS is in a non-traffic state and when the BS determines that the MS may require the higher data rate upon channel assignment, channel assignment messaging to the MS to transition the MS to a traffic state, wherein the channel assignment messaging comprises primary channel assignment information and IS-2000 Supplemental

15 Channel assignment information.

49. A base station (BS) comprising:

5 a transceiver;

10 a controller, communicatively coupled to the transceiver,

15 adapted to send to a mobile station (MS) via the transceiver a channel assignment to transition the MS to a traffic state, wherein the channel assignment provides primary channel assignment information,

 adapted to determine prior to service connection, whether upon service connection the MS may require a higher data rate than that which a primary channel can provide, and

 adapted to send to the MS in the traffic state via the transceiver, when the BS determines that the MS may require the higher data rate upon service connection, service connection messaging that comprises IS-2000 Supplemental Channel assignment information.

50. A mobile station (MS) comprising:

a transceiver;

a processor, communicatively coupled to the transceiver,

adapted to receive, via the transceiver from a base station (BS)

5 in a non-traffic state, channel assignment messaging to transition the MS to a traffic state, wherein the channel assignment messaging comprises primary channel assignment information and IS-2000 Supplemental Channel assignment information,

10 adapted to acquire using the transceiver a primary channel using the primary channel assignment information, and adapted to use via the transceiver, after acquiring the primary channel, a supplemental channel corresponding to the IS-2000 Supplemental Channel assignment information.

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51. A mobile station (MS) comprising:
 - a transceiver;
 - a processor, communicatively coupled to the transceiver,
 - adapted to receive via the transceiver from a base station (BS) a channel assignment to transition the MS to a traffic state, wherein the channel assignment provides primary channel assignment information,
 - adapted to acquire using the transceiver a primary channel using the primary channel assignment information,
 - adapted to receive via the transceiver, by the MS in the traffic state, service connection messaging that comprises IS-2000 Supplemental Channel assignment information, and
 - adapted to use via the transceiver, after service connection, a supplemental channel corresponding to the IS-2000 Supplemental Channel assignment information.